

Abstract of the Disclosure

A method for objective speech quality assessment that accounts for phonetic contents, speaking styles or individual speaker differences by distorting speech signals under speech quality assessment. By using a distorted version of a speech signal, 5 it is possible to compensate for different phonetic contents, different individual speakers and different speaking styles when assessing speech quality. The amount of degradation in the objective speech quality assessment by distorting the speech signal is maintained similarly for different speech signals, especially when the amount of distortion of the distorted version of speech signal is severe. Objective speech quality assessment for the 10 distorted speech signal and the original undistorted speech signal are compared to obtain a speech quality assessment compensated for utterance dependent articulation.

100

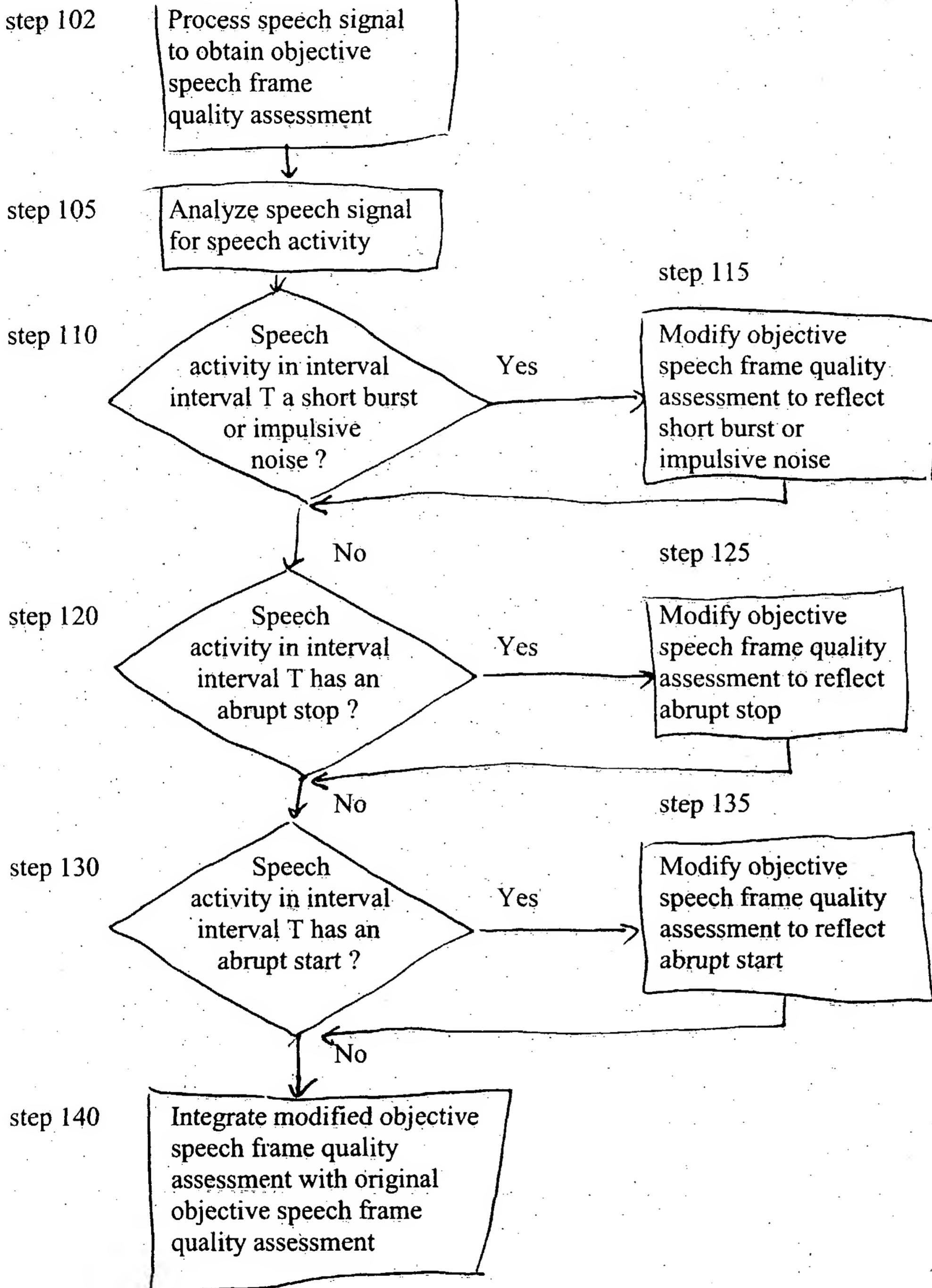


Figure I

200

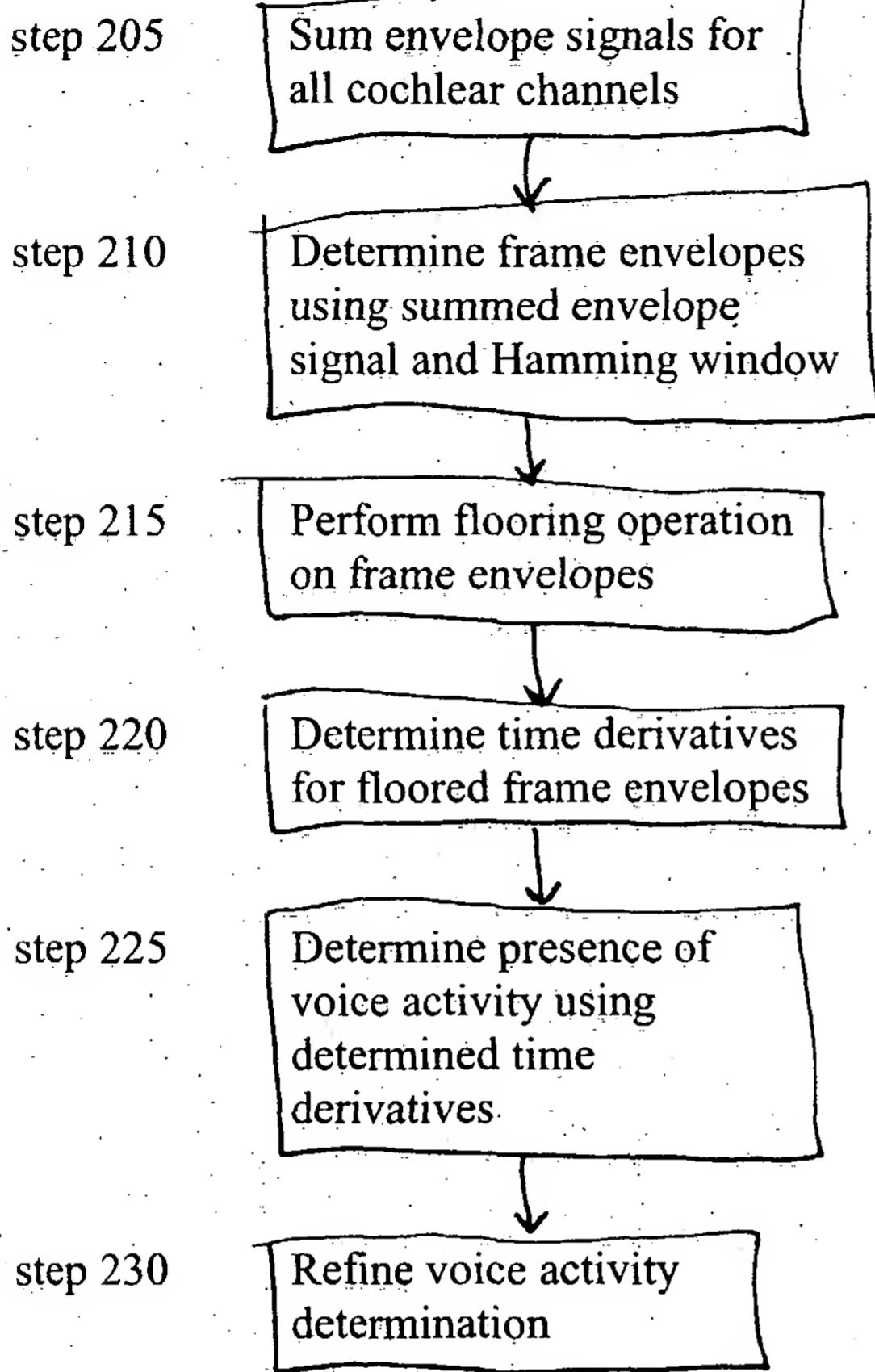


Figure 2

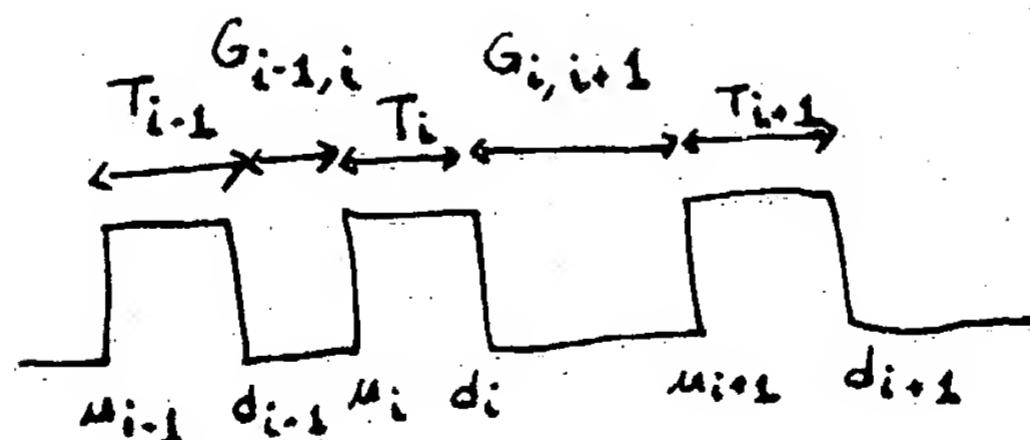


Figure 3

400

step 405

Determine impulsive noise frame  $l_I$  for speech activity interval T

step 410

Frame energy for impulsive noise frame  $l_I >$  noise threshold ?

Yes

step 415

Speech activity interval T not short burst or impulsive noise

step 420

Interval T  $\geq$  perception threshold and  $\leq$  short burst threshold ?

Yes

step 425

Speech activity interval T not short burst or impulsive noise

step 430

Maximum delta frame envelope  $>$  abrupt change threshold ?

Yes

step 435

Speech activity interval T not short burst or impulsive noise

step 440

Frame  $m_I$  sufficiently annoying to human listener ?

Yes

step 445

Speech activity interval T not short burst or impulsive noise

step 445

Human speech ?

Yes

step 455

Speech activity interval T not short burst or impulsive noise

step 460

Modify objective speech frame quality assessment

Figure 4

500

step 505

Determine abrupt stop frame  $l_M$  for speech activity interval T

step 510

Delta frame energy for abrupt stop frame  $l_M >$  abrupt stop threshold ?

Yes

step 515

Speech activity interval T does not have an abrupt stop

step 520

Duration of interval T long enough ?

Yes

step 525

Speech activity interval T does not have an abrupt stop

step 530

Maximum delta frame envelope > stop-energy threshold ?

Yes

step 535

Speech activity interval T does not have an abrupt stop

step 540

Modify objective speech frame quality assessment

Figure 5

600

step 605

Determine abrupt start frame  $l_S$  for speech activity interval T

step 610

Delta frame energy for abrupt start frame  $l_M >$  abrupt start threshold ?

Yes

step 615

Speech activity interval T does not have an abrupt start

step 620

Duration of interval T long enough ?

Yes

step 625

Speech activity interval T does not have an abrupt start

step 630

Maximum delta frame envelope > start-energy threshold ?

Yes

step 635

Speech activity interval T does not have an abrupt start

step 640

Modify objective speech frame quality assessment

Figure 6